

# B-DETECTION PLUS – THE NEXT GENERATION

MOBILE AND STATIONARY GAS MEASUREMENT SYSTEMS



## BECAUSE “ROUGHLY” ISN’T IN YOUR VOCABULARY

Even when your compressor is operated and maintained in line with professional standards, critical conditions may cause breathing air to become contaminated with hazardous substances. The consequences may be serious, endangering health or even life. Breathing air thus requires continuous monitoring. The same applies to unreliable measurement of breathing air, for example when technically unsuitable sensors are used. BAUER tackled the problem by developing its own gas measurement system in-house. The new B-DETECTION PLUS Gas Measurement System is your reliable partner for measurement needs. It is available in three versions: B-DETECTION PLUS i (integrated into your compressor<sup>1</sup>), the standalone B-DETECTION PLUS s and the new mobile and portable B-DETECTION PLUS m.

### WHY END-TO-END MONITORING OF BREATHING AIR IS VITAL

- › Avoids accidents caused by excessive CO in breathing air cylinders
- › Helps to mitigate environmental pollution from rising levels of CO<sub>2</sub>
- › Prevents freezing of scuba regulators and rust formation in the cylinder caused by excessive humidity of the compressed air
- › Supports operators with respect to liability issues in case of accidents
- › Protects own and others' health

#### Breathing Air Standard, DIN EN 12021:2014-07

	Limit values
Oxygen (O <sub>2</sub> )	21 % ± 1 %
Carbon monoxide (CO)	5 ppm
Carbon dioxide (CO <sub>2</sub> )	500 ppm
Oil	0.5 mg/m <sup>3</sup>
H <sub>2</sub> O <sup>2</sup>	25 mg/m <sup>3</sup>

<sup>1</sup> Can be integrated into compressors from the new MINI-VERTICUS, VERTICUS and PE-VE series.

<sup>2</sup> Moisture limit values measured directly downstream of compressor.



The new certification standard of PureAir GOLD was introduced by BAUER to enable breathing air filling stations to demonstrate their compliance with the highest possible level of breathing air purity. Visitors to a diving centre, customers at a diving shop, or filling staff at a firefighting station with breathing air filling system can see at a glance that they can rely one hundred per cent on compliance with the strict specifications of the DIN EN 12021: 2014 Breathing Air Standard. This compliance is monitored by B-DETECTION PLUS, the new online gas measurement system, which provides end-to-end screening of the compressed air.

To gain Gold certification, filling facilities must also meet the other PureAir certification conditions already in place:

- › Correct location and position of the compressor system as described in the operating manual. Compliance with these regulations prevents problems such as contamination of intake air by carbon monoxide from the exhaust of a compressor combustion engine.
- › Exclusive use of genuine BAUER filter cartridges. Cartridges must be produced under industrial conditions to guarantee consistent cartridge quality.
- › Monitoring of cartridge life by an internal or retrofitted B-SECURUS filter monitoring system when a B-DETECTION PLUS system without humidity sensor is used.
- › Annual inspection of the filling system by a BAUER PureAir authorized partner in accordance with DIN EN 12021:2014.

The PureAir Standard currently in operation will continue to apply as PureAir SILVER. All existing Silver stations can easily upgrade to the new PureAir GOLD Standard by retrofitting the B-DETECTION PLUS System.

## UNCOMPROMISING SAFETY WITH END TO END CONTROL



### RELIABLE AIR QUALITY CHECK

The new B-DETECTION PLUS Gas Measurement System monitors the quality of the breathing air produced by your system in compliance with the Breathing Air Standard, DIN EN 12021:2014. Automatic, continuous and ultra-reliable.



### LEGAL CERTAINTY

When one or more limit values are exceeded, the compressor shuts down automatically<sup>1</sup>. The system also runs a LiveCheck of all sensors before powering up. These safeguards ensure that breathing air cylinders are filled with nothing but pure, clean air at all times. All measurement values can be logged using the B-CONTROL MICRO and exported to an SD card as Excel files. As the system operator, this provides you with a high level of legal certainty.



### SMARTPHONE INTERACTION

The new B-APP sends all current gas measurement data to your smartphone, enabling you to check the quality of breathing air going into your cylinders at all times.



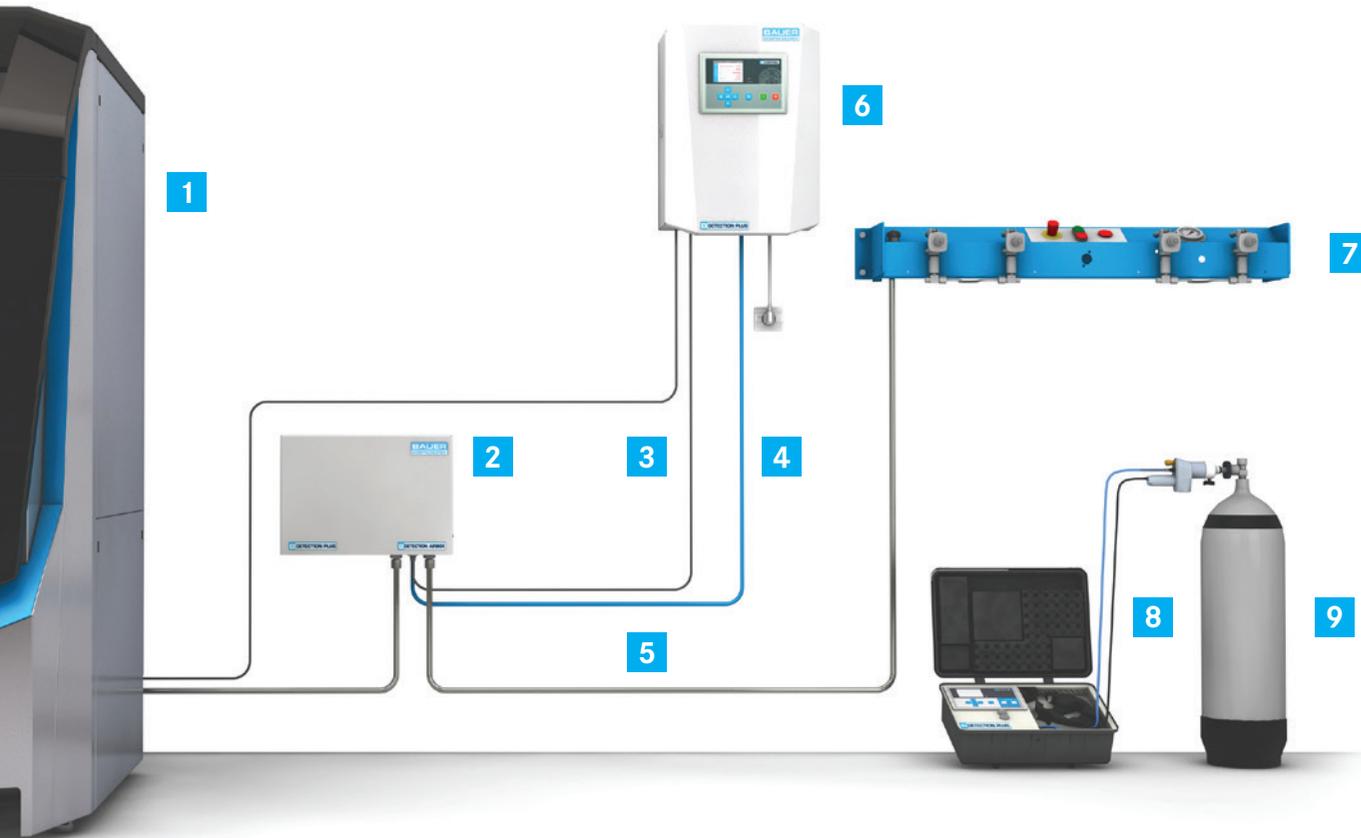
### PLUG AND PLAY

Supplied fully integrated with your compressor system, or as a standalone version for retrofitting: the B-DETECTION AIRBOX includes a full range of all necessary accessories in a single unit for rapid, simple retrofitting to existing systems.<sup>1</sup>

1. High-pressure compressor
2. B-DETECTION AIRBOX
3. Data cable
4. Gas hose
5. High-pressure piping
6. B-DETECTION PLUS s
7. External filling panel
8. B-DETECTION PLUS m
9. Breathing air cylinder



<sup>1</sup> Stationary models B-DETECTION i and s only



## SIMPLE SERVICE ACCESS

The integrated B-DETECTION PLUS i includes a connector for fast system testing, located under the front panel<sup>1</sup>. The front panel can be opened with a single movement to introduce the test gas through the connector provided.



## MOBILE SAFETY

The mobile, portable B-DETECTION PLUS m can measure breathing air directly from the cylinder or filling station as well as ambient air. Powered by an (optional) rechargeable battery, it is ready for use anywhere and any time – no need for external power sources. The housing offers IP65-rated protection against dust and water jets, enabling the B-DETECTION PLUS m to be used even in the harshest weather conditions.

<sup>1</sup> Only available on MINI-VERTICUS and VERTICUS units.

# THE NEW B-DETECTION PLUS

## CONTINUOUS MONITORING OF YOUR BREATHING AIR QUALITY



Standalone version: B-DETECTION PLUS s

**B-DETECTION PLUS Gas Measurement System monitors the quality of the breathing air you produce:** measuring CO, CO<sub>2</sub>, O<sub>2</sub> as standard and offering options for absolute humidity and residual oil (VOC)<sup>1</sup>. Automatic, continuous and ultra-reliable.

The B-CONTROL compressor control unit enables you to monitor compliance with the limit values of the DIN EN 12021:2014 Breathing Air Standard at all times<sup>1</sup>. If limit values are exceeded, the control unit displays a visual warning and shuts down the system before contaminated air can pass into the cylinders being filled.

**Automatic shutdown if flow is blocked:** To ensure continuous flow of air and guarantee correct measurement values, an integrated flow monitor automatically shuts down the compressor if the flow is interrupted or reduced, e.g. caused by piping kinks or blocked filter elements.

### B-DETECTION PLUS I FOR INTEGRATION INTO COMPRESSOR SYSTEMS

If desired, B-DETECTION PLUS i can be integrated into your new VERTICUS, MINI-VERTICUS or PE-VE system with B-CONTROL MICRO or B-CONTROL II control unit at the factory. To ensure optimum operating conditions for the sensors and maximize service life, B-DETECTION i is installed in the cold air flow. Both the gas measurement system itself and the gas extraction unit that regulates the inlet pressure of the B-DETECTION PLUS are integrated into the compressor.

**A single control unit for all components:** So convenient – simply read off the current air quality values from your compressor control unit. You can also make any changes to your B-DETECTION PLUS settings there too.

### B-DETECTION PLUS s FOR RETROFITTING AND FURTHER COMPRESSOR SYSTEMS

The new gas measurement system is also available as a standalone model, B-DETECTION PLUS s. Offering the same range of functions, it is designed for separate wall mounting and can be used with further BAUER systems or retrofitted to existing systems.

<sup>1</sup> Absolute humidity and residual oil (VOC) monitoring optional. Residual oil measurement based only on volatile organic compounds (VOCs). Sensor calibration based on isobutene.

Air quality levels are displayed on the B-CONTROL MICRO control unit of the standalone gas measurement system, which can also log measurement values. The B-DETECTION PLUS s can also automatically shut down the compressor system if contamination levels rise. Measurement values can be transmitted to the control unit, depending on the model<sup>1</sup>.

## ADDITIONAL FEATURES

- › Use of high-quality sensors with temperature compensation and additional pressure-compensated CO<sub>2</sub> sensor for extreme measurement precision
- › **All measurement values are logged:** A data logger function enables all measurement values within a defined period to be logged and exported as an Excel file using an SD card.

## OPTIONAL ACCESSORIES

- › **Gas humidifier:** For systems in operation for more than one hour per day, the additional humidification hose is recommended to maximize the service life of the electrochemical sensors (CO, O<sub>2</sub>).
- › **Automatic purge valve:** In cases where limit values are briefly exceeded, an automatic flush valve (registered as a utility patent) discharges contaminated air to the outside without interrupting operation of the system. This is particularly recommended for fully automatic operation of the system to avoid unnecessary interruption to compressor operation.
- › **Ambient air pump:** An additional pump installed in the measurement system enables the gas composition of the intake air to be analysed. Where the CO<sub>2</sub> content of the intake air is permanently at levels of 450 ppm or over, we recommend using an AERO-GUARD CO<sub>2</sub> Absorber.
- › **B-APP:** The new B-APP sends all current gas measurement data to your smartphone, allowing you to enable you to check the quality of breathing air going into your cylinders at all times<sup>1</sup>.



B-DETECTION PLUS i, integrated into a BAUER VERTICUS system

<sup>1</sup> Transmission of measurement values from the B-DETECTION PLUS s control unit to compressor control system is only possible for BAUER compressors with B-CONTROL MICRO compressor control unit with colour display.

## B-DETECTION PLUS m

### THE MOBILE SOLUTION FOR RELIABLE BREATHING AIR MEASUREMENT



Mobile version:  
B-DETECTION PLUS m

**B-DETECTION PLUS m is a compact, portable all-in-one solution that gives you the freedom to perform reliable breathing air measurement wherever and whenever you need to.**

Like the stationary models, the B-DETECTION PLUS m delivers completely reliable, ultra-precise readings to monitor compliance with DIN EN 12021 limits for CO, CO<sub>2</sub>, O<sub>2</sub> and – optionally – absolute humidity and total oil values (VOC)<sup>1</sup>.

B-DETECTION PLUS m offers an array of measurement options. The gas sampling unit supplied as standard is used to measure air quality in breathing air cylinders. Optionally, measurement can also be performed directly at the compressor. As a further option, intake air can be measured before it enters the compressor.

The control unit allows a tailored measurement profile to be selected for measuring air directly from the compressor or air cylinder.

The transport case offers IP65-rated protection against dust and water jet ingress and withstands harsh environmental conditions. Sensors are rapidly and easily accessible, simplifying maintenance.

Solid legal certainty is ensured by an integrated data logger with SD card function for performing defined individual measurements.

The patented special design of the dewpoint sensor delivers an extra-rapid response for virtually instantaneous humidity measurement.

The system offers fast venting to allow the gas sampling unit to be quickly detached from the air sampling connector.

If limit values are exceeded, the B-DETECTION PLUS m control unit activates visual alarm signals.

<sup>1</sup> Absolute humidity and oil (VOC) monitoring optional. Oil measurement based only on volatile organic compounds (VOCs). Sensor calibration based on isobutene.

## OPTIONAL ACCESSORIES

- › **Battery operation:** The integrated rechargeable battery enables measurement to be performed independently of external power sources. Its capacity covers a minimum of 5 hours of measurement. The long-life lithium-iron polymer cell guarantees an extra-high number of charging cycles.
- › **Filling hose adapter:** When connected to the system filling hose, enables air to be measured directly from the compressor.
- › **Ambient air pump:** An additional pump installed in the measurement system enables the gas composition of the intake air to be analysed. Where the CO<sub>2</sub> content of the intake air is permanently at levels of 450 ppm or over, we recommend using an AERO-GUARD CO<sub>2</sub> Absorber.
- › **B-APP:** The new free B-APP sends all current gas measurement data to your smartphone, allowing you to check the quality of the breathing air going into your cylinders at any time<sup>1</sup>.

Available in the App Store (iOS) and on GooglePlay (Android).



Gas sampling unit with optional dew point sensor



Display showing limit values in compliance with DIN EN 12021:2014

<sup>1</sup> As a requirement, the B-CONTROL MICRO (+Net) compressor control unit must have a valid IP address and be connected to the same local area network (LAN/WLAN) as the smartphone.

## OPTIMUM MAINTENANCE – HIGH-PRECISION MEASUREMENT

If an incident occurs, operators of filling systems must provide proof that only pure, clean air has been used in their filling operations. BAUER B-DETECTION PLUS Gas Measurement Systems conduct continuous and reliable measurements of all standard gases covered by the DIN EN 12021:2014 Breathing Air Standard. This provides users of breathing air with the maximum safety and certainty.

Cylinders are filled with pure air only, ensuring that divers, firefighters and other users are supplied with pure breathing air that complies with the regulations of DIN EN 12021:2014. However, to ensure this reliability is maintained, sensors must be tested every three months. BAUER supplies testing kits tailored to the needs of the user.

The Calibration and Test Gas Kit contains the basic set of all test and calibration gases for your B-DETECTION PLUS Gas Measurement System. It is designed for local operators seeking to test and calibrate their systems at regular intervals, and also for technicians and appropriately trained individuals tasked with replacing sensors.

The Test Gas Kit contains the basic set of all test gases for your B-DETECTION PLUS Gas Measurement System. It is designed for local operators seeking to test their systems at regular intervals.

Test gases are guaranteed to meet the highest quality standards. The gas blends are tailored precisely to the measurement sensor systems. They have a BAUER-guaranteed shelf life of two years from the manufacturing date. Every batch of products is tested using ultra-precise analysis processes and 100% documented.

BAUER gas blends are tailored precisely to the measurement sensor systems, providing the basis for highly accurate measurement results. The sensors of B-DETECTION systems must be calibrated annually and tested at least every three months.

Compressed gas cylinders can be shipped by sea or road. However, given the hazard class of gas cylinders, air transport might be prohibited (depending on the country group of the destination) or involves significant extra costs.

Please check the shipping terms before ordering (dangerous goods ID of 1-litre containers: UN2037).



Test gas kit

To ensure measurements are performed to the highest precision by the gas measurement system and lengthen the service life of the device, we recommend the following inspection intervals:

Inspection Types	Intervals
Function check / Calibration	Before each use / Every 3 months
CO, O <sub>2</sub> sensor replacement	Annually
Inspection records	Every 3 years

## B-DETECTION CALIBRATION AND TEST GAS KITS: CONTENTS

### CALIBRATION AND TEST GAS KIT, COMPLETE: 180907-KD<sup>1</sup>

Contents in detail	Number	Comments	Order number
Case	1x	For test/calibration gases, with inlay	N42895
Pressure reducer	1x	For gas cylinders for testing and calibration, 1 litre/12 bar	N42334
Calibration gas	1x	12 litres / Calibration gas Low for CO, CO <sub>2</sub> , VOC	N42328
Calibration gas	1x	12 litres / Calibration gas High for CO, CO <sub>2</sub> , O <sub>2</sub>	N42330
Test gas	1x	12 litres / Test gas for CO, CO <sub>2</sub> , O <sub>2</sub> and High gas for VOC	N42332
Calibration gas	1x	12 litres / Calibration gas Low for O <sub>2</sub>	N40706

### TEST GAS KIT, SMALL: 181590-KD<sup>1</sup>

Contents in detail	Number	Comments	Order number
Case	1x	For test gases, with inlay	N40381
Test gas	2x	12 litres / test gas for CO, CO <sub>2</sub> , O <sub>2</sub> and High Gas for VOC	N42332
Pressure reducer	1x	For gas cylinders for testing and calibration, 1 litre/12 bar	N42334

### TEST GAS KIT, LARGE: 181336-KD<sup>1</sup>

Contents in detail	Number	Comments	Order number
Case	1x	For test gases, with inlay	N42895
Test gas	4x	12 litres / test gas for CO, CO <sub>2</sub> , O <sub>2</sub> and High Gas for VOC	N42332
Pressure reducer	1x	For gas cylinders for testing and calibration, 1 litre/12 bar	N42334

### TOOLS / AUXILIARIES LARGE BOTTLES

Tools / Auxiliaries large bottles	Order number
High calibration gas CO, CO <sub>2</sub> and O <sub>2</sub> : 300 litre / 150bar @ 2 litre bottle	N43678
Low calibration gas (zero gas) CO, CO <sub>2</sub> and VOC: 300 litre / 150bar @ 2 litre bottle	N43677
Low calibration gas (zero gas) O <sub>2</sub> : 300 litre / 150bar @ 2 litre bottle	N43680
Pressure regulator + PUR-hose 300 litre connection	N43809
Test gas CO, CO <sub>2</sub> , O <sub>2</sub> and high calibration gas VOC, 300 litre / 150bar @ 2 litre bottle	N43679

<sup>1</sup> Also available as single part without case

# TECHNICAL DATA

## B-DETECTION PLUS

### MEASUREMENT VALUES

Carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), oxygen (O<sub>2</sub>), absolute humidity<sup>1</sup>, VOC<sup>1</sup>

### SYSTEM LIMITATIONS

Maximum system pressure	350 bar
Maximum permissible charging rate compressor	850 l/min
Permissible operating temperature	+5°C... +45°C

### MEASUREMENT METHOD

CO <sub>2</sub>	Nondispersive infrared spectroscopy (NDIR)
CO, O <sub>2</sub>	electrochemical
Absolute humidity	Via dew point
VOC (oil)	Photoionization detector (PID)

### MEASUREMENT VALUES AND MEASUREMENT ACCURACY<sup>4</sup>

CO <sub>2</sub>	0... 2,000 ppm ± 2.5 % Full scale
CO	0 ... 25 ppm ± 2 % of measurement range final value
O <sub>2</sub>	0 % ... 40 % O <sub>2</sub> ± 1 % of measurement range final value
Dew point	-70 ...+60°C / 10 ... 40,000 ppm ± 2°C / 1 ppm + 20% of displayed value
VOC (oil)	0 ... 1 ppm (based on isobutene as calibration gas)

### FURTHER TECHNICAL SPECIFICATIONS

Operating voltage	integrated: 24 VDC; standalone: 100-250 VAC, 50/60 Hz
Flow rate	1.0 ... 3.0 l/min
Weight	integrated: 3 kg; standalone: 8.5 kg
Dimensions H x W x D [mm] with access	integrated: 160 x 260 x 92; standalone: 462 x 354 x 184

### SYSTEMTEST/CALIBRATION

Visual and tightness test	Monthly
Function check <sup>2</sup>	Min. 3-monthly
System check <sup>3</sup>	Annually
Calibration	CO <sub>2</sub> and PID sensor: annually and after replacing sensor; dew point sensor: every 24 months

## B-DETECTION PLUS m

### TECHNICAL DATA

Weight	8.9 kg
Dimensions L x W x H [mm]	464 x 366 x 180

1 Optional extra

2 Includes Test with calibration gas; kit with testing gas cylinders and pressure reducer (flow meter) available from BAUER KOMPRESSOREN

3 System check includes replacement of electrochemical sensors (CO and O<sub>2</sub>)

4 Accuracy valid at max. +/- 10 ° C deviation from calibration temperature.

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